bility even though she had no goiter and no eye signs and she received, with this idea in mind, several X-ray exposures of her thyroid gland, but with absolutely no improvement.

There rather fragmentary clinical observations which are selected more or less at random would seem in a general way, therefore, to demonstrate that the present pandemic has been a fairly complete replica of the pandemic of 1889-91. It has given an opportunity for an extensive trial of vaccination and some serum therapy which was not possible 30 years ago, but the conclusion which it seems we must make is that our knowledge of the clinical course of influenza and our methods of treatment are the same and no more than they were 30 years ago, with the exception—that we can establish leukopenia as a characteristic sign of influenza in the early days of the disease; and that like dengue, a very similar infection, a filterable virus will probably be discovered as the etiological agent of influenza.

THE TREATMENT OF POST-INFLUENZAL PNEUMONIA IN AN ARMY HOSPITAL.*

By W. W. ROBLEE, M. D., Riverside, Cal.

The Influenza epidemic threw a sudden and immense strain upon the Army hospitals. Because of the concentration of the men in barracks, the spread of the disease, once it was introduced, was rapid and apparently uncontrollable. It was my fortune to be Chief of Medical Service at the Embarkation Hospital at Newport News, Virginia, at that time. We received patients from our local camps, troop trains, Army transports and the Merchant Marine. The ambulances were busy day and night transporting the sick, and ofttimes dying, soldiers to us for care. The epidemic ran its course in six weeks, but those were weeks of strenuous endeavor on the part of the entire hospital staff. During the month from September 20th to October 20th, 623 cases of Pneumonia entered our Service. There were 161 deaths, giving us a mortality rate of 25.8 per cent.

As a result of our experience with these cases and over 800 Pneumonia cases preceding the Influenza epidemic, a series of 1500 in all, I would sum up the treatment of Pneumonia in one word, *"Individualization."* It is absolutely essential that every pneumonia patient become known and watched by both surgeon and nurse.

When the seriousness of the epidemic manifested itself and it became evident that surgeons, nurses and enlisted men would become seriously taxed before it ended, measures were taken to cut unnecessary labor to a minimum. Paper work, reports, routine ward work, temperature taking, etc., were all reduced to the bare necessities of the case, in order that the sick men could have the undivided attention of the entire service. The most competent ward surgeons were placed in the pneumonia wards, and by order of the Commanding Officer were excused from all duty outside the wards. A specially well qualified pneumonia expert was placed on night duty, in order that expert service might be given during the hours when it is ordinarly handled by an officer of the day, or night inspector, whose intentions may be good but, if perchance he comes from some other department, he may be helpless in the treating of these cases.

Specific Therapy. The sputum was typed after the Avery method in all cases. The Type I pneumococcus cases were given serum unless, as not infrequently was the case, a crisis came and the pateint became convalescent before the laboratory findings had been returned to us. No other specific treatment was attempted. Our laboratory force was untiring in the effort to find the causative organism in this epidemic and we were nearly forced to the conclusion that no known organism affecting the respiratory tract could be given an ætiological role therein. Reports from other Army hospitals confirm our conclusion that the Influenza infection seldom, if ever, causes death, but that the mortality comes from secondary invasion by whatever organism happens to be present in a given locality.

An examination of 677 specimens of sputum gave:

Pneumococcus I	8.1%
Pneumococcus II	.3%
Pneumococcus III	0
Pneumococcus IV	58.4%
Streptococcus Viridans	32.2%
Streptococcus Hæmolyticus	.3%
Pfeiffer Bacillus	.3%

Bloodcultures from the living and cultures from post mortem heart's blood and lung punctures gave the same findings. With us, therefore, at that time Pneumococcus Type IV-Type I and Streptococcus Viridans were the secondary invaders. Fort Riley reports Streptococcus Hæmolyticus in large numbers. Camp Deven, the Pfeiffer bacillus, etc. With us, the bacteriological findings were practically the same as had been found in our pneumonia cases during the summer and early fall. There being no specific organism in this epidemic and knowing of no specific serum of proven curative value in the treatment of pneumonia caused by the organisms enumerated above, we did not feel justified in giving the "shot gun" mixtures so quickly and widely advertised by some commercial firms. We felt that the discomforts and debilitating effects of serum sickness, with subsequent sensitization to all sera, is not lightly to be recommended for any patient. As for the use of bacterial emulsions, vaccines, etc., for curative purposes in an acute infection they are theoretically and practically to be condemned. If by chance, a homalogous strain is administered, it only adds to the toxæmia already present. As a prophylactic agent or as an aid to the development of immunity in a dragging, chronic condition, they may be of service in some infections, but those considerations certainly do not apply to a disease producing an overwhelming toxæmia such as occurs in pneumonia. We did not use blood serum from convalescent cases intravenously. A study of early reports

*Read before the Forty-eighth Annual Meeting of the Medical Society, State of California, Santa Barbara, April, 1919.

on this method of treatment did not convince us that better results were being obtained than was the case with us by our well-tested methods. To be safe and of service, the blood must be secured (1) from a patient who has recently had Pneumonia of the type from which the patient, who is to be transfused, is suffering; (2) a donor well enough to stand the loss of blood must be found; (3) his blood must not agglutinate that of the patient; (4) he must be free from latent syphilis, tuberculosis or other infective organisms; (5) the procedure must be carried out before the patient is in extremis. All of these considerations entail a burden of laboratory work that is impossible during the progress of an epidemic such as we have recently experienced.

Morphine: This point in therapy, we believe to be of prime importance. Small doses of morphine frequently given, and if necessary an occasional larger one, control restlessness, delirium and cough and thus conserve the strength of the patient. Many patients wear themselves out unless the sedatives are given. The old idea that morphine in some mythical manner locks up secretions (whatever that may mean) and that it causes an accumulation in pneumonia is absurd. The idea that the patient must be encouraged to cough up the secretion is wrong. A major portion of the material causing the consolidation in pneumonia is carried away by the circulation and is not expectorated via the bronchial tubes and trachea. The use of morphine is, in our experience, a life-saving measure.

Digitalis: Was given in a large series of cases, and the opinion that had been forming in our minds during our previous experience was confirmed. We concluded that it is of distinct value when dilatation is beginning or fibrillation present and as a prophylactic in the prevention of these conditions, but that it is of doubtful value for the gradually ascending heart rate and weakness of severe toxæmia. When given, it should be crowded until either steadying or block develops. The tincture supplied at this hospital could be given in four cc. doses every two hours until fifty cc. had been given, then in one cc. doses until the effect desired had been obtained, which is usually reached at sixty or seventy cc. We felt that camphor is more valuable as a stimulant in toxæmia than is digitalis; that it is somewhat sedative to the nervous system and has some probable value as a meningococcocide.

Salt Solution was given intravenously in a series of cases, and we feel that some patients were carried over the danger period by that means. It should not be used in most cases of broncho-pneumonia. It simply adds to the work of the heart and increases the "water-logged" condition of the lungs. Its value, if any, is in selected cases of lobar involvement showing depression of body and mind. Salt Solution intravenously and whisky by mouth are then of real value.

Lactose in 5% solution was given intravenously to the slender, dry-skinned cases who manifestly had a small accumulation of fuel to carry them through their time of stress. Bicarbonate of soda and glucose solutions were given freely, intravenously and by proctocclysis, to those who developed nausea and vomiting, on the theory that an acidosis probably was present. Our overworked laboratory force was unable to undertake investigations looking toward the settling of that point.

Turpentine stupes and soap suds enemas, with an occasional dose of pituitrin, were our chief dependence for abdominal distention.

Baths: After a large series of cases had been studied, we came to the conclusion that baths given for the reduction of temperature were of no value and were, in fact, often a detriment to the patient. A quickly given tepid sponge-bath once or twice daily, with as little disturbance of the patient as possible, was given and no attempt made to use other hydrotherapeutic measures.

Diet: Simple as possible. No effort was made to crowd the feeding during the acute stage of the illness. Fruit juices, to which plenty of sugar was added, milk and whisky were given if the patient did not object, and the free drinking of water encouraged. The use of alcoholic stimulants in pneumonia is a debatable subject. We used whisky very freely in some wards, none in others. As a final conclusion, we feel that it has three points of usefulness:

1. As a food and fuel supply in slender, dry-skinned patients.

2. As a sedative in delirious cases. Whisky given freely in many of those cases has a soothing effect and helped control the delirium. A gentle "jag" seemed to us to be of service in those cases and we do not believe that it in any way added to the toxæmia.

3. Small amounts, 15 cc. once in three hours, was a very grateful bracer to the average patient, especially the depressed, exhausted type. We are aware that these views do not correspond entirely with the theoretical conclusions as to alcohol and its physiological action, but given a patient whose vital reactions are modified by the toxins of a severe acute infection, we feel that practically we are justified in the above conclusions.

All serious cases, so far as possible, were treated on porches until convalescence was well established.

The complications in our Pneumonia cases during this epidemic were not numerous, but were very interesting. This we account for by the fact that the one organism for which the army early acquired a very hearty respect, the streptococcus hæmolyticus, was practically absent in our locality during this epidemic. During the spring months, we had a very serious experience with it and it was occurring with increasing frequency during the last month of my service, December.

A few cases of empyæma developed, and our experience coincides with that of the other army hospitals. Costectomy should be employed in all cases which develop pus, but not during the stage of acute pneumonia or active pleurisy. If necessary to relieve the embarrassed respirations during that period or before rank pus develops, aspiration

may be performed. We did not employ lavage by Dakin's Solution. Our results were entirely satisfactory by drainage following costectomy done under local anæsthesia.

Twenty-six cases of meningenismus occurred among our pneumonia patients. All gave a sterile spinal fluid and improvement in the nervous systems usually followed the puncture. During this time, we were caring for seven cases of meningitis in our meningitis ward, but as none were complicated by pneumonia, they will not be discussed here.

Otitis media and sinusitis were seldom seen and of mild character. No mastoids became involved. Here again, we believe the absence of streptococcus hæmolyticus to have accounted for our escape from serious consequences.

Hemorrhages from nose, lungs, stomach, rectum and bladder were observed. No specific treatment was undertaken for the condition, as we did not feel that there was sufficient loss of blood in any case to jeopardize the patient's chance for recovery.

Pericarditis, endocarditis and post infectious myocardial weakness were remarkably absent. Most of our cases made a very prompt recovery and comparatively few were obliged, because of myocardial weakness, to remain in the hospital beyond the thirty day fever-free period which was our rule for the discharge of pneumonia cases. This, we again attribute to the absence of streptococcus hæmolyticus during this epidemic. I do, however, want to stress the importance of the after care of the heart in pneumonia. We became convinced, after our experience during the winter and spring with certain type pneumococcus and streptococcus hæmolyticus pneumonias, that toxic myocarditis was a sequel of these cases in a very large percentage of cases and that too little attention was given to it during convalescence by the average physician.

Figures given below, compiled from the record of our pneumonia convalescent ward for a series of 270 cases, studied between April 15th and August 15th, prior to the influenza epidemic, give myocarditis requiring special care and prolonged rest in 120, or 44.4%. The streptococcus hæmolyticus was an active factor with a percentage of this total of 45.76. The following table, compiled by Lieut. W. M. Scott, surgeon in charge of this ward, gives the figures for the series. From April 15th to August 15th, 1918, there were 270 convalescent pneumonia cases admitted to the ward. Of this number, 120 had post infectious myocarditis as a complication (44.4%).

Type of Organism.	Number of Cases.	Per Cent.
Streptococcus Haemolyticus	55	45.76
Streptococcus Viridans	12	10.00
Pneumococcus Type I	15	12.50
Pneumococcus Type II	2	1.66
Pneumococcus Type III	1	.83
Pneumococcus Type IV	25	20.80
Streptococcus Haemolyticus and Streptococcus Viridans	3	2.50
Streptococcus Viridans and Pneumococcus Type I	1	.83
Not typed	4	3.33
Pneumococcus Type IV and Streptococcus Viridans	1	.86
Staphylococcus Albus	1	.86

Prolonged rest in bed often sixty or ninety days, followed by painstaking re-education and strengthening of the heart muscle by graduated exercises, is of prime importance and will save many a patient from life-long invalidism due to a permanently damaged heart caused by too early physical strain. I have seen hearts which were spread out in all directions and with murmurs at every arifice under this plan regain tone, reduce in size and the murmurs disappear. Incidentally, I might add that too much stress has been laid upon the dilated right heart in pneumonia. Dilatation, when it occurs, is due to toxic myocarditis. All chambers are involved and usually the left ventricle is much more spread out than is the right. Watch your pneumonia hearts carefully and you will find that I am correct.

We saw occasional cases of arterial and venous thrombosis, the abdominal syndrome simulating appendicitis or cholecystitis, psychoses, convulsions and subcutaneous emphysema, all of which required careful study and appropriate treatment, which I will not take time to speak of here unless requested to do so in the course of the discussion.

Subcutaneous Emphysema: This developed as a complication in seven pneumonia cases. The subcutaneous tissue of the neck, chest, abdomen, scrotum and thighs became involved in the order named. Four died. One of the cases that recovered had marked swelling and crackling upon palpation from neck down to both knees. The neck and chest in these cases became greatly swollen, the temperature did not run high and death, when it occurred, came from gradual circulatory failure. Subcutaneous punctures for culture purposes were made and no bacillus Welchii or other organisms were found. One case came to autopsy and air was found present in the pericardial sac and mediastinal spase in addition to subcutaneous tissues. No ulcer or other pathological opening into the lung was found, but we are nevertheless of the opinion that the emphysema was due to leakage of air and not to gas bacillus infection.

PULMONARY CONDITIONS WRONGLY DIAGNOSED AS TUBERCULOSIS.*

By WILLIAM C. VOORSANGER, M. D., San Francisco.
Discussed by Dr. Hurwitz, Dr. Pottenger, Dr. Shortle, Dr. Voorsanger.

The studies of recent years upon sputum cultures, particularly the work of Luetscher, the investigation upon the agglutination of various bacilli and particularly the more recent work in government laboratories and army base hospitals, have greatly upset conventional clinical methods of diagnosis and have made us realize that many pulmonary conditions which in the past we looked upon as tuberculosis were in reality something else. An internist recently made the statement that "tuberculosis men were responsible for diagnosing every pulmonary condition as tuberculosis." This might have been the case at one time, but I feel sure that every real "tuberculosis man" today undiagnoses tuberculosis as much as he diagnoses it. Sanitarium physicians have often made the

*Read before the Forty-eighth Annual Meeting of the Medical Society, State of California, Santa Barbara, April, 1919.